

tricts, and generally they were limited both in number and intensity.

I.—A slight depression was central in Minnesota on the last of May. On the morning of the 1st of June this depression had moved eastward to central Wisconsin, and light showers prevailed in the upper lake region and Mississippi valley. The high area to the north of Minnesota apparently forced this disturbance to the southward during the 1st, and although well-defined as central in eastern Iowa at the morning report of the 2d, it lost energy when the area of rain extended southward over the Gulf states.

II.—This depression extended over the Rocky mountain regions on the morning of the 4th, when a barometric trough extended from British America to northern Mexico. Within this extended depression two minor depressions were observed, one central in southern Utah and the other in northern Montana. The depression traced as number ii., continued almost stationary over the southern plateau region from the 4th until the 7th, when it passed to the eastern slope of the Rocky mountains. An area of high barometer appeared to the north of the upper Missouri valley on the 8th, and the cool northerly winds from that region apparently increased this depression over the lower Missouri valley, and thence eastward during the 8th and 9th. On the morning of the 8th the barometer was low from the lower Saint Lawrence valley southwestward to Arizona, and high on the Atlantic and Gulf coasts, and in British America north of Dakota. The flow of cool air from north of the lake region resulted in general rains and strong northerly winds north of the Ohio valley and in the northwest on the 9th, as this disturbance passed eastward over the states north of the Ohio river. The barometer fell to 29.6 at Indianapolis, Indiana, at midnight of the 9th, when the centre of disturbance was near that station, and heavy rains were reported from the southern states northward to the lake region. This depression continued its easterly course until 3 p. m. of the 10th, when it moved directly south, attended by continued rains in the southern states. The barometer rose at the centre of this depression as it moved southward, and it finally disappeared by a gradual increase of pressure. The rains attending this depression continued in the southern states east of the Mississippi river until the 13th.

III.—This area formed a part of the barometric trough which extended over the Rocky mountains on the 4th, 5th, and 6th, the chief depression being central over the southern plateau region. After passing eastward to the central Missouri valley during the 5th and 6th, it apparently united with the disturbance traced as number ii., which was central in eastern Colorado at 3 p. m. of the 7th.

IV.—The morning reports of the 11th indicated that a low area was slowly forming in the Rocky mountain regions—local rains and northerly winds being reported from the northern stations, and the barometer reading below 29.7 in Colorado. The 3 p. m. report of the 11th exhibited a well-marked depression in eastern Colorado, with indications of the advance of a cool wave from north of the lake region. This disturbance moved northward from Colorado on the 11th, and finally disappeared in central Dakota on the 12th.

V.—This low area was central in northern Nevada at 11 p. m. of the 13th. The area of high barometer which extended over the regions north of Lake Superior apparently caused this depression to move northeastward over Montana, and it disappeared to the north of the Rocky mountain stations on the 14th, the barometer remaining low in the southern districts of the Rocky mountains during the greater portion of the month.

VI.—This disturbance developed in the upper Mississippi valley on the 25th, and passed directly eastward over the Ohio valley and the middle Atlantic states during the 25th and 26th. It increased in energy as it approached the coast, and the sudden and heavy rains caused much damage by floods in the middle Atlantic states and southern New England. Destructive gales also occurred on the 26th and 27th at coast stations between Cape Hatteras and New York. This distur-

ance passed directly eastward from the coast and was apparently prevented from following the usual northeasterly course, by the high area which extended over the region immediately to the north.

NORTH ATLANTIC STORMS DURING JUNE, 1884.

[Pressure expressed in inches and in millimetres; wind-force by scale of 0–10.

The paths of the atmospheric depressions that have appeared in the north Atlantic ocean during the month are approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels, and from other miscellaneous data received at this office up to July 22, 1884.

The observations used are in general simultaneous, being taken each day at 7h. a. m. Washington, or 12h. 8m. p. m. Greenwich, mean time.

Only four depressions are charted for June, 1884; none of these exhibited any decided storm energy nor can they be identified with any of the depressions which appeared in the United States. Several slight and unimportant disturbances (not charted) appear to have moved from northern Canada over the Gulf of Saint Lawrence to the Atlantic, where they dissipated. The weather over the north Atlantic during the month may be summarized as follows: 1st to 14th, general cloudy weather, light variable airs to moderate westerly and northerly breezes; 15th to 22d, weather changeable, light to moderate breezes, variable in direction; 22d to 30th, moderate to strong southwest to northwest winds, increasing occasionally to moderate gales; weather overcast and rainy. (The heavy northeasterly gales which prevailed on the Atlantic coast, between Cape Hatteras and Sandy Hook during the 26th, 27th, and 28th, occurred in connection with low area vi. and high area vi., and are referred to under the respective headings.) Frequent and dense fogs prevailed over the region west of the fortieth meridian from the 1st to 25th.

The following descriptions refer to the depressions charted:

1.—This disturbance was first noticed by the s. s. "Strassburg," H. Heineke, commanding. On the 2d, that vessel, in N. 39° 7', W. 65° 16', had barometer 29.84 (757.9), a fall of about .4 inch during the previous twenty-four hours; on the 1st the wind was n. and nw., force 7 to 8, changing on the 2d to ssw. and sw., force 7 to 8. On the same date the s. s. "Noordland," in N. 40° 8', W. 63° 28', had a fresh ne. to se. gale, with rainy weather. By the 3d the disturbance had moved northward and was central south of Nova Scotia, the lowest reported pressure being about 29.85 (758.2). During the day it apparently moved northward or northwestward over the maritime provinces and disappeared in the Gulf of Saint Lawrence on the 4th.

2.—This disturbance appeared near N. 47°, W. 39°, on the 8th; on that date the s. s. "Wieland," C. Heibich, commanding, reported in N. 46° 47', W. 38° 10', barometer 29.75 (755.6), wind ssw., force 4. Vessels to the westward of W. 40°, had moderate westerly and northwesterly winds, while those to the eastward, between W. 40° and 30°, had moderate southerly winds. By the 9th the depression had moved north-northeastward to about N. 55°, W. 29°; the s. s. "Lake Huron," W. Bernson, commanding, in N. 53° 40', W. 29° 54', reported barometer 29.53 (750.0), wind wnw., force 7; heavy sea and cloudy. Over the region south of the fiftieth parallel the pressure was 30.0 (762.0) and above; during the 9th, another depression, (not charted), appears to have moved eastward north of the fiftieth parallel, as indicated by the following report: barkentine "Corisande," D. Thoms, commanding; "at 10 p. m., Greenwich time, on the 9th, in N. 52° 25', W. 42° 50', the wind, which was ssw., increased to a moderate gale and veered to w., barometer reading 29.5 (749.3). On the 10th, in N. 53° 25', W. 39° 17', the barometer read 29.58 (751.3), wind w., force 6, heavy sea and cloudy weather." During the day, both depressions disappeared beyond the limits of observation.

3.—This disturbance appeared in the Gulf of Saint Law-

rence on the 15th; it probably moved eastward over Newfoundland, and on the 16th, the centre was to the westward of the fiftieth meridian, the lowest reported barometer reading being 29.8 (756.9), wind ssw., force 6, hazy. The depression moved northeastward and on the 17th, was probably near N. 55°, W. 35°; the s. s. "Brooklyn," G. S. Dale, commanding, reported in N. 52° 3', W. 35° 45', barometer 29.73 (755.1), wind wsw., force 4, raining; s. s. "Grecian," C. E. LeGallais, commanding, in N. 51° 35', W. 39° 37', barometer 29.84 (757.9), wind n., force 2, cloudy. The depression either filled in or passed northward beyond the range of observations; its eastward movement was apparently retarded by an area of high pressure which occupied the ocean north of N. 50° and east of W. 30°, from the 14th to the 18th.

4.—This disturbance appeared in mid-ocean on the last day of the month. Its presence is indicated by the following reports: S. S. "Toronto," J. McAuley, commanding, in N. 56° 15', W. 29° 1', barometer 29.51 (749.5), wind s., force 6, hazy; s. s. "Lake Manitoba," Wm. Steward, commanding, in N. 53° 40', W. 29° 50', barometer 29.55 (750.6), wind ssw., force 6, overcast; s. s. "Celtic," B. Gleadell, commanding, in N. 49° 15', W. 30° 51', barometer 29.64 (752.8), wind s. by w., force 6, overcast and rainy; s. s. "Nessmore," J. Inch, commanding, in N. 46° 52', W. 32° 30', barometer 29.63 (752.6), wind ssw., force 6, cloudy; s. s. "Werra," J. Barre, commanding, in N. 46° 39', W. 35° 15', barometer 29.66 (753.4), wind wnw., force 6, squally. These reports show a decrease of pressure averaging .35 inch during the twenty-four hours preceding the observation of the 30th.

OCEAN ICE.

Chart i. also exhibits the southern and eastern limits of the region within which icebergs were observed in the north Atlantic ocean from June 1st to July 3d, 1884. These limits are determined from reports sent by shipmasters to this Office; reports furnished through the co-operation of the "New York Herald Weather Service," and from other data published in the "New York Maritime Register."

The extreme southern limit of the ice-region was near N. 40° 40', W. 48°, and extended thence westward along the forty-first parallel to about W. 54°. The easternmost limit of the ice-region was near W. 45° 30'.

Compared with the chart for the preceding month (May), there is a slight difference in the positions of the limits, the southern limit in June being about 30' south of that for May, while the eastern limit is about one degree to the westward of the May limit.

A comparison with the chart for the corresponding month in 1883, shows no difference in the southern limit of the ice-region, but the eastern limit is about 3° 30' to the westward of that for last year.

A comparison with the chart for the same month in 1882, shows that the area of the ice-region in June, 1884, is much less than for the same month in 1882. In the latter year, icebergs were reported as far south as N. 39° 30', or about a degree south of the limit in 1884; the eastern limit of the ice-region reached W. 39°, or about 6° 30' farther to the east than during the present month.

The following reports have been received up to July 21, 1884. Captain H. McKay, commanding the s. s. "Bothnia," reported: "May 30th, between N. 43° 04', W. 47° 55', and N. 42° 16', W. 49° 37', passed several icebergs. In N. 42° 47', W. 48° 26', passed within half a mile of a large iceberg, and found no difference in the temperature of the air and water, which was: air 52°, water 52°. On the 31st, in N. 41° 56', W. 51° 12', passed a piece of ice, very dangerous to shipping."

June 1st.—S. S. "Republic," in N. 41° 53', W. 51° 35', passed an iceberg; also one in N. 41° 47', W. 51° 14'; s. s. "Scandinavian," in N. 42° 54', W. 49° 8', passed two icebergs.

2d.—S. S. "State of Georgia," between N. 42° 30', W. 49° 20' and N. 42° 36', W. 48° 17', passed three icebergs; two of them very large.

3d.—S. S. "Arizona," between N. 42° 20', W. 49° 46' and N. 42° 48', W. 48° 35', passed several icebergs.

5th.—Captain D. Thoms, commanding the barkentine "Corisande," reported having encountered much ice outside the harbor of Saint John's, Newfoundland.

7th.—Bark "Silica," in N. 60° 15', W. 50° 22', reported several icebergs in sight; s. s. "Amerique," in N. 41° 10', W. 53° 1', passed an iceberg.

8th.—S. S. "British Prince," in N. 41° 12' W. 50° 36', passed three icebergs; the largest being about one hundred feet high and five hundred feet long; s. s. "Aurania," in N. 42° 4', W. 48° 5', passed two icebergs and several pieces of drift ice; s. s. "Saint Laurent," in N. 42° 36', W. 49° 22', passed a small iceberg; also in N. 42° 38', W. 48° 37', passed another; also in N. 42° 40', W. 48° 26', passed a large iceberg, with another berg in sight to the southward; s. s. "Lake Manitoba," passed several icebergs from 90 to 150 miles ene. of Cape Race.

9th.—S. S. "Polynesia," in N. 42° 12', W. 48° 16', passed two icebergs; s. s. "Gellert," in N. 41° 55', W. 48° 34', passed a large iceberg, apparently about 1,500 feet long and one hundred and fifty feet high.

11th.—S. S. "City of Berlin," in N. 42° 17', W. 48° 35', passed two icebergs; temperature of the air, 57°; water, 54°; s. s. "Circassian," in N. 47° 40', W. 49° 50', passed an iceberg and several small pieces.

12th.—S. S. "Lake Huron," in N. 48° 19', W. 50° 20', passed an iceberg; s. s. "Oregon," between N. 44° W. 45° 23' and N. 44° 3', W. 49° 30', passed three icebergs.

13th.—Ship "Derby," in N. 42° 42', W. 48° 20', passed a large iceberg; bark "J. Walter Scammell," in N. 45° 13', W. 48° 34', passed an iceberg.

14th.—S. S. "Phoenician," in N. 42° 34', W. 50° 58' passed a small iceberg.

15th.—S. S. "Oder," in N. 46° 20', W. 48° 28', passed a large iceberg; s. s. "State of Pennsylvania," in 41° 38' and from W. 48° to W. 49°, passed six icebergs; s. s. "Ludgate Hill," in N. 42° 40', W. 51° 3', passed an iceberg; ship "Alfred D. Snow," in N. 44° 45', W. 48° 00', passed an iceberg; s. s. "Canada," in 42° 25', W. 48° 15', passed an iceberg; s. s. "Lydian Monarch," in N. 47° 10', W. 49° 27', passed several icebergs and small pieces; s. s. "Grecian" in N. 47° 10', W. 51° 15' passed four icebergs; also in 47° 25', W. 50°, passed two icebergs.

16th.—S. S. "Leerdam," in N. 45° 22', W. 52° 50', passed an iceberg about one hundred and fifty feet high and of great length.

17th.—S. S. "Germanic," in N. 42° 19', W. 48° 36', passed an iceberg about sixty feet high, also passed a dozen small pieces of ice in a group.

18th.—S. S. "Lord Gough," in N. 43° 28', W. 48° 4', passed one large and one small iceberg; s. s. "Britannic," in N. 43° 50', W. 48° 42', passed several icebergs; s. s. "Lemuria," in N. 43° W. 48°, passed an iceberg; ship "Shakespeare," in N. 52° 30', W. 45° 55', passed an iceberg.

19th.—Bark "Homborgsund," in N. 41°, W. 47°, passed fifteen or twenty icebergs, some fifty feet high; ship "Shakespeare," in N. 46° 30', W. 48°, passed an iceberg about two hundred feet high; bark "Chignecto," in N. 46° 22', W. 49° 5' passed an iceberg.

20th.—S. S. "Britannia," in N. 40° 42', W. 47° 49', passed two icebergs about one hundred feet high; bark "Chignecto," in N. 46° 20', W. 50° 10', passed an iceberg; s. s. "Arizona," in N. 45° 54', W. 47° 50', saw two large icebergs twenty miles to the southward; s. s. "Brooklyn," in N. 47° 00', W. 50° 40', passed two large icebergs; from there to Cape Race saw several bergs; one, very long and low, bore ene., twenty miles from Cape Race; s. s. "Gallia," in 43° 14', W. 47° 58', passed an iceberg.

22d.—S. S. "Rhynland," in N. 40° 48', W. 47° 50', passed two icebergs, one very large; also, in N. 40° 45', W. 48° 40', passed several icebergs.

24th.—S. S. "Egypt," in N. 45° 48', W. 45° 30', passed an

iceberg; bark "Gloire," in N. 43° 20', W. 48° 00', passed an iceberg.

25th.—S. S. "Elbe," in N. 43° 22', W. 47° 42', passed a large iceberg.

27th.—S. S. "Circassia," between N. 46° 49', W. 48° 37' and N. 46° 12', W. 50° 00', passed several icebergs and detached pieces of ice; s. s. "Acoriano," in N. 44° 52', W. 45° 35' passed an iceberg apparently two hundred feet high and two miles long.

29th.—S. S. "Donau," in N. 42° 16', W. 48° 20', passed a large iceberg; ship "E. J. Spicer," off Cape Race, saw five icebergs.

30th.—"Assyrian Monarch," in N. 43° 50', W. 48° 10', passed an iceberg.

July 3d.—S. S. "Circassian," in N. 54° 15', W. 48° 27', passed a large iceberg; from there to Belle Isle, passed about sixty bergs; at 10 p. m., passed Belle Isle, and from there to Point Amour, passed about twenty large bergs, extending across the strait.

TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for June, 1884, is exhibited on chart ii. by the dotted isothermal lines.

In the following table are shown the normal temperatures for June, the mean temperatures for June, 1884, and the departures from the normal for each of the several geographical districts, as deduced from the records of the Signal Service:

Average temperatures for June, 1884.

Districts.	Average for June, 1884, with the average for several years.		Comparison of June, 1884, with the average for several years.
	For several years.	For 1884.	
New England.....	63.5	64.8	1.2 above.
Middle Atlantic states.....	70.6	69.9	0.7 below.
South Atlantic states.....	77.3	73.5	3.8 below.
Florida peninsula.....	81.9	78.9	3.0 below.
Eastern Gulf states.....	79.3	75.6	3.7 below.
Western Gulf states.....	80.2	78.3	1.9 below.
Rio Grande valley.....	84.6	82.1	2.5 below.
Tennessee.....	76.2	72.4	3.8 below.
Ohio valley.....	73.3	73.5	0.2 above.
Lower lake region.....	65.5	67.3	1.8 above.
Upper lake region.....	61.5	62.8	1.3 above.
Extreme northwest.....	62.0	66.4	4.4 above.
Upper Mississippi valley.....	71.0	70.9	0.1 below.
Missouri valley.....	70.6	72.0	1.4 above.
Northern slope.....	62.3	64.8	2.5 above.
Middle slope.....	70.5	70.1	0.4 below.
Southern slope.....	78.5	75.7	2.8 below.
Southern plateau.....	77.7	73.9	3.8 below.
Northern plateau.....	64.8	66.2	1.4 above.
North Pacific coast region.....	60.8	60.7	0.1 below.
Middle Pacific coast region.....	68.7	64.8	3.9 below.
South Pacific coast region.....	71.9	70.6	1.3 below.
Mount Washington, N. H.....	43.7	49.0	5.3 above.
Pike's Peak, Colo.....	33.0	30.4	2.6 below.
Salt Lake City, Utah.....	68.3	68.7	0.4 above.

Over the northern portions of the United States the mean temperatures were higher than the average for June, and over the southern portions of the country, they were lower. A comparison of the monthly mean temperatures reported from the various stations, with their respective normals for June, shows two areas of maximum departures below the normal—one comprising Tennessee, the south Atlantic and east Gulf states, and the other including California (except along the coast where a normal condition prevailed) and Arizona. In the first-named district the most marked deficiencies occurred at the following stations: Charlotte, South Carolina, 6°.2; Atlanta, Georgia, 5°.5; Memphis, Tennessee, 5°.2; Augusta, Georgia, 5°; and Savannah, Georgia, 4°.8. In western Arizona and eastern California the deficiencies varied from 4°.1, at Yuma, Arizona, and Sacramento, California, to 4°.9, at Prescott, Arizona, and 7°.9 at Red Bluff, California. Over a narrow area extending from the Gulf coast northward to the Missouri

river the deficiencies varied from 1° to 2°. In the northern part of the country but one area of maximum departure above the normal temperature is shown, viz.: the northern portions of Dakota and Minnesota, where the mean temperatures ranged from 4° to 6° above the normal at Saint Vincent, Minnesota, to 6° to 6° above at Bismarek and Fort Buford, Dakota, respectively; in the upper Mississippi valley and north Pacific coast region, the means were about normal; and over the other northern districts they were from 1° to 4° above.

The following are some of the highest and lowest monthly mean temperatures reported from the Signal Service stations:

Stations reporting highest.	Stations reporting lowest.
Rio Grande City, Texas.....	Pike's Peak, Colorado.....
Maricopa, Arizona.....	Mount Washington, New Hampshire.....
Key West, Florida.....	Fort Stanton, New Mexico.....
Yuma, Arizona.....	Cape Mendocino, California.....
Galveston, Texas.....	Fort Canby, Washington Territory.....
Fort McDowell, Arizona.....	Eastport, Maine.....
Indianola, Texas.....	Duluth, Minnesota.....
Brownsville, Texas.....	Fort Klamath, Oregon.....
Shreveport, Louisiana.....	Olympia, Washington Territory.....
El Paso, Texas.....	San Francisco, California.....
Cedar Keys, Florida.....	Marquette, Michigan.....
Fort Concho, Texas.....	Milwaukee, Wisconsin.....
Sanford, Florida.....	Macinaw City, Michigan.....

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of comparative temperatures for June, 1884. Voluntary observers report the following notes in connection with this subject:

Arkansas.—Lead Hill, Boone county: mean temperature, 76° 4, is 0° 2 above the June average of the two preceding years.

Dakota.—Webster, Day county: mean temperature, 76° 6, is 6° 8 above the June average of the two preceding years.

Illinois.—Swanwick, Perry county: mean temperature, 71° 8, is 1° 4 below the June average of the last three years.

Anna, Union county: mean temperature, 73° 7, is 2° 2 below the June average of the last nine years.

Riley, McHenry county: mean temperature, 66° 1, corresponds with the June normal for a period of twenty-three years.

Mattoon, Coles county: mean temperature, 72° 0, is 0° 6 below the June average of the last four years.

Collinsville, Madison county: mean temperature, 72° 3, is 2° 7 below the June normal.

Morrison, Whiteside county: mean temperature, 68° 0, is 1° 2 below the average of the last nine years.

Indiana.—Wabash, Wabash county: mean temperature, 71° 1, is 1° 2 above the June average of the last eight years.

Logansport, Cass county: mean temperature, 71° 6, is 2° 8 below the June average for a period of twenty-five years.

Kansas.—Independence, Montgomery county: mean temperature, 73° 1, is 2° below the June average of the last thirteen years.

Lawrence, Douglas county: mean temperature, 71° 1, is 2° 9 below the June average of seventeen years.

Wellington, Sumner county: mean temperature, 71° 4, is 2° 8 below the June average of the last six years.

Maine.—Gardiner, Kennebec county: mean temperature, 64° 1, is 0° 8 above the June average of the last forty-eight years.

Maryland.—Fallston, Harford county: mean temperature, 68° 5, is 2° 3 below the June average of a period of thirteen years.

New York.—Palermo, Oswego county: mean temperature, 65° 1, is 1° 4 above the June average of the last thirty-one years.

North Volney, Oswego county: mean temperature, 67° 4, is 2° 3 above the June average of the last sixteen years.

Dannemora, Clinton county: mean temperature, 69° 4, is the highest June mean of the last five years.